

Name \_\_\_\_\_ Period \_\_\_\_\_

**Skill 21.01 Problem 1**

| (a) Draw the Lewis electron-dot structure for each of the following                       |                 |                              |
|---|-----------------|------------------------------|
| NO <sub>2</sub>   | NO <sub>2</sub> | NO <sub>2</sub> <sup>+</sup> |
| (b) List the species in order of <u>increasing</u> N-O-N bond angle. Justify your answer. |                 |                              |

**Table 1. Geometry of simple molecules**

| Bonding atoms | Lone pairs | Geometry             | Bond angles                     | Examples    |
|---------------|------------|----------------------|---------------------------------|-------------|
| 2             | 0          | Linear               | HgCl <sub>2</sub>               | 180°        |
| 3             | 0          | Trigonal planar      | BF <sub>3</sub>                 | 120°        |
| 4             | 0          | Tetrahedral          | CCl <sub>4</sub>                | 109.5°      |
| 5             | 0          | Trigonal bipyramidal | PCl <sub>5</sub>                | 90° & 120°  |
| 6             | 0          | Octahedral           | SF <sub>6</sub>                 | 90°         |
| 2             | 1          | Bent                 | SO <sub>2</sub>                 | <120°       |
| 3             | 1          | Trigonal pyramidal   | NI <sub>3</sub>                 | <109.5°     |
| 2             | 2          | Bent                 | H <sub>2</sub> S                | <109.5°     |
| 4             | 1          | seesaw               | XeO <sub>2</sub> F <sub>2</sub> | >90°, <120° |
| 3             | 2          | T-shaped             | ClF <sub>3</sub>                | 90°, 180°   |
| 2             | 3          | Linear               | I <sub>3</sub> <sup>-</sup>     | 180°        |

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|   |   |                  |                   |      |
|---|---|------------------|-------------------|------|
| 5 | 1 | Square pyramidal | XeOF <sub>4</sub> | <90° |
| 4 | 2 | Square planar    | XeF <sub>4</sub>  | 90°  |

**Skill 21.02 Problem 1**

|  |  |
|--|--|
| Draw the Lewis structures for the following molecules. For each molecule, use table 1 to determine geometry. |  |
| (a) CH <sub>4</sub>  |  |
| (b) CO <sub>2</sub>  |  |
| (c) H <sub>2</sub> O   |  |
| (d) NH <sub>3</sub>  |  |
| (e) BeH <sub>2</sub>   |  |
| (f) SF <sub>4</sub>  |  |

Chemistry  
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Set 21: Molecular Geometry

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|                    |
|--------------------|
| (g) $\text{SF}_6$  |
| (h) $\text{BH}_3$  |
| (i) $\text{XeF}_4$ |